2007

Nebraska Summary: S620 Case-IH Puma 165

Nebraska Tractor Test Laboratory
University of Nebraska-Lincoln, tractortestlab@unl.edu

SUMMARY OF OECD TEST 2410–NEBRASKA SUMMARY 620
CASE IH PUMA 165 DIESEL
19 SPEED

POWER TAKE-OFF PERFORMANCE

Power HP *(kW)*	Crank shaft speed rpm	Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1022 rpm)					
139.7 *(104.2)*	2200	9.45 *(35.77)*	0.467 *(0.284)*	14.79 *(2.91)*	
Standard Power Take-off Speed (1000 rpm)					
141.5 *(105.5)*	2153	9.35 *(35.41)*	0.456 *(0.277)*	15.14 *(2.98)*	
Maximum Power (1 hour)					
163.2 *(121.7)*	1800	9.50 *(35.95)*	0.401 *(0.244)*	17.18 *(3.39)*	
VARYING POWER AND FUEL CONSUMPTION					
139.7 *(104.2)*	2200	9.45 *(35.77)*	0.467 *(0.284)*	14.79 *(2.91)*	Air temperature
122.0 *(91.0)*	2260	8.88 *(33.63)*	0.502 *(0.306)*	13.74 *(2.71)*	70°F *(21°C)*
92.5 *(69.0)*	2285	7.34 *(27.77)*	0.547 *(0.333)*	12.60 *(2.48)*	Relative humidity
62.5 *(46.6)*	2310	5.81 *(22.01)*	0.641 *(0.390)*	10.76 *(2.12)*	45%
31.5 *(23.5)*	2330	4.15 *(15.70)*	0.907 *(0.552)*	7.60 *(1.50)*	Barometer
-- --	2345	2.78 *(10.51)*	-- --	-- --	29.6" Hg *(100.2 kPa)*

Maximum Torque - 539.7 lb.-ft. *(731.8 Nm)* at 1400 rpm
Maximum Torque Rise - 61.8%
Torque rise at 1800 engine rpm - 42%

DRAWBAR PERFORMANCE
(Unballasted - Front Drive Engaged)
FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—8th Gear									
107.0 *(79.8)*	10045 *(44.69)*	3.99 *(6.43)*	2203	6.0	0.609 *(0.371)*	11.42 *(2.25)*	183 *(84)*	81 *(27)*	29.5 *(100.0)*
75% of Pull at Maximum Power—8th Gear									
85.1 *(63.5)*	7530 *(33.50)*	4.24 *(6.82)*	2271	4.2	0.626 *(0.380)*	11.09 *(2.18)*	181 *(83)*	81 *(27)*	29.5 *(100.0)*
50% of Pull at Maximum Power—8th Gear									
57.3 *(42.7)*	5020 *(22.32)*	4.28 *(6.89)*	2293	3.2	0.795 *(0.483)*	8.75 *(1.72)*	179 *(82)*	73 *(23)*	29.5 *(100.0)*
75% of Pull at Reduced Engine Speed—9th Gear									
86.6 *(64.6)*	7510 *(33.40)*	4.32 *(6.96)*	1975	4.2	0.569 *(0.345)*	12.18 *(2.40)*	179 *(82)*	75 *(24)*	29.5 *(100.0)*
50% of Pull at Reduced Engine Speed—9th Gear									
59.4 *(44.3)*	5135 *(22.85)*	4.34 *(6.98)*	1941	3.6	0.675 *(0.410)*	10.30 *(2.03)*	178 *(81)*	72 *(22)*	29.5 *(100.0)*

Location of tests: HBLFA Francisco Josephinum BLT Biomass-Logistics-Technology, Rottenhauser, Strabe, 1, AT, 3250, Wieselburg, Austria

Dates of tests: April -July, 2007.

Manufacturer: CNH Osterreich GmbH SteyrerstraBe, 32, 4300, St. Valentin, Austria

FUEL and OIL: Fuel No. 2 Diesel **Specific gravity converted to 60°/60°F *(15°/15°C)*** 0.829 **Fuel weight** 6.90 lbs/gal *(0.827 kg/l)* **Oil SAE** 10W30 **API service classification** CG-4 **Transmission and hydraulic lubricant** Case IH Hytran Ultra fluid **Front axle lubricant** Case IH Hytran Ultra fluid

ENGINE: Make CNH Diesel **Type** six cylinder vertical with turbocharger and air to air intercooler **Serial No.** 359098 **Crankshaft** lengthwise **Rated engine speed** 2200 **Bore and stroke** 4.094" x 5.197" *(104.0 mm x 132.0 mm)* **Compression ratio** 16.5 to 1 **Displacement** 410 cu in *(6728 ml)* **Starting system** 12 volt **Lubrication** pressure **Air cleaner** two paper elements and aspirator **Oil filter** one full flow cartridge **Oil cooler** engine coolant heat exchanger for crankcase oil, radiator for hydraulic and transmission oil **Fuel filter** two papercanisters **Muffler** underhood **Exhaust** vertical **Cooling medium temperature control** thermostat and variable speed fan

CHASSIS: Type front wheel assist **Serial No.** Z6BH01009 **Tread width** rear 60.2" *(1530 mm)* to 87.8" *(2230 mm)* front 61.4" *(1560 mm)* to 89.0" *(2260 mm)* **Wheelbase** 113.5" (*2884 mm)* **Hydraulic control system** direct engine drive **Transmission** selective gear fixed ratio with full range operator controlled powershift **Nominal travel speeds mph *(km/h)*** first 1.21 *(1.94)* second 1.45 *(2.33)* third 1.74 *(2.80)* fourth 2.09 *(3.36)* fifth 2.52 *(4.05)* sixth 3.03 *(4.87)* seventh 3.49 *(5.62)* eighth 4.20 *(6.76)* ninth 5.05 *(8.12)* tenth 6.06 *(9.76)* eleventh 7.30 *(11.75)* twelfth 8.78 *(14.13)* thirteenth 10.09 (*16.24)* fourteenth 12.13 *(19.52)* fifteenth 14.57 *(23.45)* sixteenth 17.52 *(28.20)* seventeenth 21.08 *(33.92)* eighteenth 25.35 *(40.79)* nineteenth 25.35 *(40.80)* (1700 engine rpm) reverse 2.67 *(4.30)*, 3.21 *(5.16)*, 3.85 *(6.20)*, 4.63 *(7.45)*, 5.57 *(8.96)*, 6.70 *(10.78)* **Clutch** multiple wet disc electro-hydraulically operated by foot pedal **Brakes** wet disc hydraulically operated by two foot pedals that can be locked together **Steering** hydrostatic **Power take-off** 540 rpm at 1950 engine rpm or 1000 rpm at 2154 engine rpm **Unladen tractor mass** 17725 lb *(8040 kg)*

DRAWBAR PERFORMANCE

(Unballasted - Front Drive Engaged)

MAXIMUM POWER IN SELECTED GEARS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F(°C) cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
					6th Gear				
104.7 *(78.1)*	16345 *(72.71)*	2.40 *(3.87)*	2018	14.2	0.628 *(0.382)*	11.07 *(2.18)*	184 *(84)*	84 *(29)*	29.4 *(99.5)*
					7th Gear				
118.8 *(88.6)*	15750 *(70.06)*	2.83 *(4.56)*	2004	11.9	0.557 *(0.339)*	12.49 *(2.46)*	184 *(84)*	84 *(29)*	29.4 *(99.5)*
					8th Gear				
126.9 *(94.6)*	15245 *(67.82)*	3.12 *(5.02)*	1814	11.1	0.521 *(0.317)*	13.35 *(2.63)*	180 *(82)*	84 *(29)*	29.4 *(99.5)*
					9th Gear				
128.2 *(95.6)*	12495 *(55.59)*	3.85 *(6.19)*	1801	7.7	0.515 *(0.313)*	13.50 *(2.66)*	172 *(78)*	86 *(30)*	29.4 *(99.5)*
					10th Gear				
129.7 *(96.7)*	10315 *(45.89)*	4.72 *(7.59)*	1800	6.0	0.509 *(0.310)*	13.65 *(2.69)*	172 *(78)*	86 *(30)*	29.4 *(99.5)*
					11th Gear				
128.9 *(96.1)*	8685 *(38.63)*	5.57 *(8.96)*	1800	5.9	0.517 *(0.314)*	13.40 *(2.65)*	174 *(79)*	82 *(28)*	29.4 *(99.5)*
					12th Gear				
126.7 *(94.5)*	6995 *(31.12)*	6.79 *(10.94)*	1800	4.5	0.525 *(0.319)*	13.22 *(2.60)*	176 *(80)*	84 *(29)*	29.4 *(99.5)*

REPAIRS AND ADJUSTMENTS: No repairs or adjustments.

NOTE: The data on this summary was obtained from OECD report 2409 conducted on the New Holland T7030 Diesel.

REMARKS: All test results were determined from observed data obtained in accordance with official OECD test procedures. This tractor did not meet the manufacturer's claims of 70.0 dB(A) cab sound level, 39.6 gpm *(150 lpm)* remote hydraulic flow nor 3 point lift capacities of 12787 lbs *(5800 kg)* or 15873 lbs *(7200 kg)*. The performance figures on this summary were taken from a test conducted under the OECD Code II test procedure.

We, the undersigned, certify that this is a true summary of data from OECD Report No. **2410** Nebraska Summary 620, November 17,2008.

Roger M. Hoy
Director

M.F. Kocher
V.I. Adamchuk
J.A. Smith
Board of Tractor Test Engineers

TRACTOR SOUND LEVEL WITH CAB	**Front Wheel Drive Disengaged dB(A)**	**Engaged dB(A)**
At no load in 8th gear	72.0	72.0
Bystander	--	--

TIRES, BALLAST AND WEIGHT	**Tested without ballast**
Rear Tires - No., size, ply & psi(*kPa*)	Two 710/70R38;**;15(*100*)
Front Tires - No., size, ply & psi(*kPa*)	Two 600/65R28;**;15(*100*)
Height of Drawbar	23.6 in (*600 mm*)
Static Weight with operator - Rear	10955 lb (*4970 kg*)
- Front	6935 lb (*3145 kg*)
- Total	17890 lb (*8115 kg*)

DRAWBAR PERFORMANCE

(Unballasted - Front Drive Disengaged)

FUEL CONSUMPTION CHARACTERISTICS

Power Hp *(kW)*	Drawbar pull lbs *(kN)*	Speed mph *(km/h)*	Crank-shaft speed rpm	Slip %	Fuel Consumption lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Temp.°F *(°C)* cool-ing med	Air dry bulb	Barom. inch Hg *(kPa)*
Maximum Power—8th Gear									
108.5 *(80.9)*	10230 *(45.51)*	3.98 *(6.40)*	2206	7.2	0.606 *(0.369)*	11.47 *(2.26)*	176 *(80)*	75 *(24)*	29.7 *(100.5)*
75% of Pull at Maximum Power—8th Gear									
84.1 *(62.7)*	7690 *(34.20)*	4.10 *(6.60)*	2271	5.5	0.659 *(0.401)*	10.55 *(2.08)*	176 *(80)*	75 *(24)*	29.7 *(100.5)*
50% of Pull at Maximum Power—8th Gear									
57.0 *(42.5)*	5105 *(22.70)*	4.19 *(6.74)*	2295	4.6	0.809 *(0.492)*	8.59 *(1.69)*	180 *(82)*	75 *(24)*	29.7 *(100.5)*
75% of Pull at Reduced Engine Speed—9th Gear									
85.4 *(63.7)*	7700 *(34.26)*	4.16 *(6.69)*	1908	5.1	0.579 *(0.353)*	12.00 *(2.37)*	176 *(80)*	77 *(25)*	29.7 *(100.5)*
50% of Pull at Reduced Engine Speed—9th Gear									
57.7 *(43.0)*	5085 *(22.63)*	4.25 *(6.84)*	1929	4.2	0.692 *(0.421)*	10.05 *(1.98)*	174 *(79)*	77 *(25)*	29.7 *(100.5)*

MAXIMUM POWER IN SELECTED GEARS

5th Gear									
76.7 *(57.2)*	12930 *(57.52)*	2.22 *(3.58)*	2266	14.2	0.766 *(0.466)*	9.08 *(1.79)*	181 *(83)*	73 *(23)*	29.7 *(100.5)*
6th Gear									
91.9 *(68.5)*	12920 *(57.48)*	2.67 *(4.29)*	2240	13.6	0.713 *(0.434)*	9.75 *(1.92)*	178 *(81)*	79 *(26)*	29.7 *(100.5)*
7th Gear									
102.1 *(76.1)*	12335 *(54.86)*	3.10 *(4.99)*	2206	11.5	0.637 *(0.388)*	10.91 *(2.15)*	180 *(82)*	79 *(26)*	29.6 *(100.4)*
8th Gear									
114.9 *(85.7)*	12490 *(55.57)*	3.45 *(5.55)*	2044	11.8	0.572 *(0.348)*	12.16 *(2.40)*	178 *(81)*	75 *(24)*	29.6 *(100.4)*
9th Gear									
122.6 *(91.4)*	12735 *(56.65)*	3.61 *(5.81)*	1812	13.3	0.541 *(0.329)*	12.84 *(2.53)*	176 *(80)*	73 *(23)*	29.6 *(100.4)*
10th Gear									
127.1 *(94.8)*	10455 *(46.50)*	4.56 *(7.34)*	1805	8.6	0.523 *(0.318)*	13.30 *(2.62)*	172 *(78)*	73 *(23)*	29.7 *(100.5)*
11th Gear									
110.8 *(82.6)*	7110 *(31.63)*	5.84 *(9.40)*	1810	7.0	0.587 *(0.357)*	11.83 *(2.33)*	172 *(78)*	73 *(23)*	29.7 *(100.5)*
12th Gear									
109.8 *(81.9)*	5890 *(26.19)*	6.99 *(11.25)*	1800	5.3	0.603 *(0.367)*	11.52 *(2.27)*	172 *(78)*	75 *(24)*	29.7 *(100.5)*

This vehicle is equipped with an electronically controlled engine Power management system that monitors and boosts engine power output in certain circumstances. This is achieved by electronically changing the characteristics of the engine power-speed curve. The engine Power management function ("boosted" power level) becomes active in the higher transmission gears (16th and above) and for road transport applications. The system is also activated when power transfer through the PTO exceeds a preset level (and forward speed exceeds 0.5 km/h), for mobile PTO driven implement applications. An overide system is provided to enable PTO operations at the "boosted" power level while the vehicle is stationary for test purposes. The results of of this PTO output test are presented below.

POWER TAKE-OFF PERFORMANCE

Power HP *(kW)*	Crank shaft speed rpm	Gal/hr *(l/h)*	lb/hp.hr *(kg/kW.h)*	Hp.hr/gal *(kW.h/l)*	Mean Atmospheric Conditions
MAXIMUM POWER AND FUEL CONSUMPTION					
Rated Engine Speed—(PTO speed—1022 rpm)					
172.1 *(128.3)*	2200	10.96 *(41.47)*	0.439 *(0.267)*	15.70 *(3.09)*	
Standard Power Take-off Speed - (1000 rpm)					
177.0 *(132.0)*	2153	10.94 *(41.41)*	0.426 *(0.259)*	16.18 *(3.19)*	
Maximum Power (1 hour)					
186.4 *(139.0)*	1900	10.99 *(41.61)*	0.407 *(0.247)*	16.96 *(3.34)*	
VARYING POWER AND FUEL CONSUMPTION					
172.1 *(128.3)*	2200	10.96 *(41.47)*	0.439 *(0.267)*	15.70 *(3.09)*	Air temperature
149.0 *(111.1)*	2240	10.02 *(37.95)*	0.464 *(0.282)*	14.87 *(2.93)*	63°F *(17°C)*
113.3 *(84.5)*	2270	8.40 *(31.81)*	0.512 *(0.312)*	13.48 *(2.66)*	Relative humidity
76.4 *(57.0)*	2300	6.47 *(24.50)*	0.584 *(0.355)*	11.81 *(2.33)*	45%
38.6 *(28.8)*	2320	4.61 *(17.45)*	0.824 *(0.501)*	8.38 *(1.65)*	Barometer
-- --	2345	2.85 *(10.80)*	-- --	-- --	29.7"Hg *(100.5 kPa)*

Maximum Torque 579.1 lb.-ft. *(785.1 Nm)* at 1600 rpm
Maximum Torque Rise - 40.9%
Torque rise at 1800 rpm - 32%

HYDRAULIC PERFORMANCE

CATEGORY: IIIN
Quick Attach: No
OECD Static test

	2 x 90 mm	2 x 100 mm
Lift cylinders:		
Maximum force exerted through whole range:	10275 lbs *(45.7 kN)*	13490 lbs *(60.0 kN)*

	Standard pump	High flow pump
i) Sustained pressure at compensator cutoff:	3175 psi *(219 bar)*	3175 psi *(219 bar)*
	two outlet sets combined	
ii) Pump delivery rate at minimum pressure:	32.0 GPM *(121.0 l/min)*	39.1 GPM *(148.1 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	27.0 GPM *(102.0 l/min)*	35.5 GPM *(134.5 l/min)*
Delivery pressure:	2830 psi *(195 bar)*	2610 psi *(180 bar)*
Power:	44.5 HP *(33.2 kW)*	54.2 HP *(40.4 kW)*
	single outlet set	
ii) Pump delivery rate at minimum pressure:	26.2 GPM *(99.3 l/min)*	26.2 GPM *(99.2 l/min)*
iii) Pump delivery rate at maximum hydraulic power:	25.8 GPM *(97.7 l/min)*	25.7 GPM *(97.4 l/min)*
Delivery pressure:	2540 psi *(175 bar)*	2540 psi *(175 bar)*
Power:	38.2 HP *(28.5 kW)*	38.1 HP *(28.4 kW)*

THREE POINT HITCH PERFORMANCE(SAE Static test)

Observed maximum pressure psi. *(bar)*	3175 *(219)*
Location:	lift cylinder
Hydraulic oil temperature: °F *(°C)*	150 *(65)*
Location:	hydraulic sump
Category:	IIIN
Quick attach:	none

System pressure 2865 psi *(197 Bar)* Lift cylinders - 2 x 90 mm

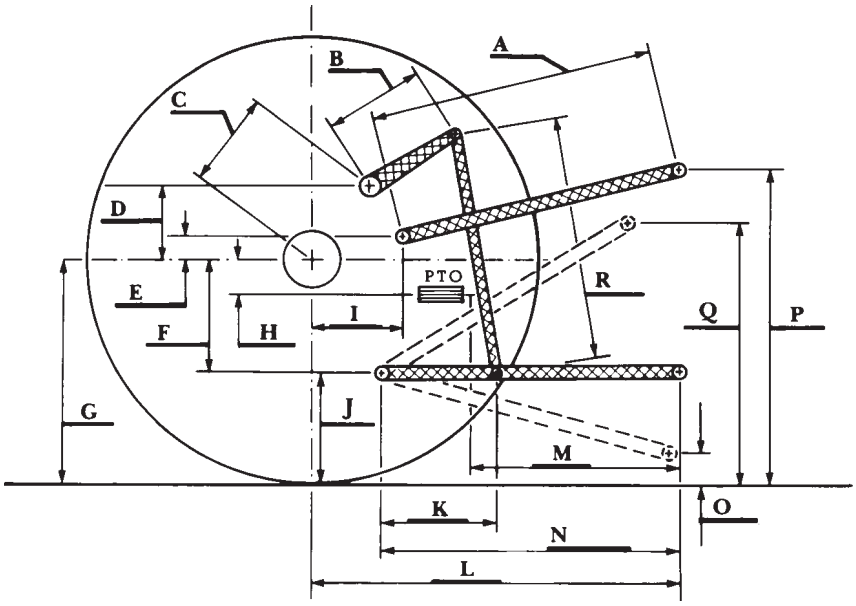
Hitch point distance to ground level in. *(mm)*	19.7 *(500)*	21.9 *(555)*	25.8 *(655)*	33.7 *(855)*	45.3 *(1150)*
Lift force on frame lb	13195	13155	13195	13080	11690
" " " " " " *(kN)*	*(58.7)*	*(58.5)*	*(58.7)*	*(58.2)*	*(52.0)*

System pressure 2865 psi *(197 Bar)* Lift cylinders - 2 x 100 mm

Hitch point distance to ground level in. *(mm)*	19.7 *(500)*	21.9 *(555)*	25.8 *(655)*	35.8 *(910)*	45.3 *(1150)*
Lift force on frame lb	14930	15015	15175	15150	14230
" " " " " " *(kN)*	*(66.4)*	*(66.8)*	*(67.5)*	*(67.4)*	*(63.3)*

HITCH DIMENSIONS AS TESTED—NO LOAD

	OECD test		SAE test	
	inch	*mm*	inch	*mm*
A	31.9	*810*	31.5	*800*
B	17.9	*454*	17.9	*454*
C	15.1	*383*	15.1	*383*
D	14.6	*372*	14.6	*372*
E	10.9	*277*	10.9	*277*
F	10.6	*270*	10.6	*270*
G	36.4	*925*	36.4	*925*
H	2.4	*60*	2.4	*60*
I	19.7	*440*	19.7	*440*
J	25.8	*655*	25.8	*655*
K	26.9	*682*	26.9	*682*
L	48.2	*1224*	48.2	*1224*
M	23.1	*587*	23.1	*587*
N	38.3	*974*	38.3	*974*
O	9.0	*230*	19.7	*500*
P	52.8	*1340*	47.8	*1214*
Q	38.2	*970*	45.3	*1150*
R	40.2	*1022*	34.4	*875*



Institute of Agriculture and Natural Resources
University of Nebraska–Lincoln